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***MASTER OF MILITARY STUDIES***

**AMPHIBIOUS SEARCH AND RESCUE:  
SHAPING THE FUTURE**

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**Thesis:** The current Amphibious Search and Rescue (ASAR) mission is outdated, lacks integration with the mission/doctrine of the amphibious forces and fails to exploit the multi-mission and tactical capabilities of the MH-60S helicopter. The Navy and the Marine Corps must recognize and integrate the capabilities of the MH-60S with the vision and doctrine of the amphibious forces in order to define the ASAR mission, then develop procedures to perform the stated mission requirements.

**Discussion:** The mission of Navy helicopters in the ATF has developed in piecemeal fashion; based solely on the capabilities of the HH-46D helicopter and not integrated with the mission requirements of the ATF and MEU. As a result, ASAR detachments have limited capabilities for critical missions in the ATF, including NSW, TRAP, and AT/FP.

The MH-60S, the replacement helicopter for the aging HH-46D, is a tactical platform with capabilities for the following missions: Maritime Dominance, Logistics, CSAR, NSW, and AMCM missions.

The Navy helicopter community must look forward to determine if the current mission will remain viable in the near future

**Recommendations:** Implement a four-helicopter detachment into the ATF and expand the ASAR mission to include AMCM, overwater TRAP, NSW, and "Limited" ASUW, AT/FP and SSC roles. Two of the four helicopters would be specifically outfitted for AMCM missions.

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## EXECUTIVE SUMMARY

**Title:** AMPHIBIOUS SEARCH AND RESCUE: SHAPING THE FUTURE

**Author:** Lieutenant Commander Michael G. Dowling, U.S. Navy

**Thesis:** The current Amphibious Search and Rescue (ASAR) mission is outdated, lacks integration with the mission/doctrine of the amphibious forces and fails to exploit the multi-mission and tactical capabilities of the MH-60S helicopter. The Navy and the Marine Corps must recognize and integrate the capabilities of the MH-60S with the vision and doctrine of the amphibious forces in order to define the ASAR mission, then develop procedures to perform the stated mission requirements.

**Discussion:** The Fleet Combat Support (HC) helicopter community has been performing the ASAR mission in the Amphibious Task Force (ATF) since 1990. The mission of Navy helicopters in the ATF has developed in piecemeal fashion; based solely on the capabilities of the HH-46D helicopter and not integrated with the mission requirements of the ATF and Marine Expeditionary Unit (MEU). As a result, ASAR detachments have limited capabilities for critical missions in the ATF, including Naval Special Warfare (NSW), Tactical Recovery of Aircraft and Personnel (TRAP), and Anti-terrorism/Force Protection (AT/FP). Additionally, the current ASAR detachment structure will not meet future Airborne Mine Countermeasures (AMCM) mission requirements.

The capabilities of the ATF in the near future will be vastly different than today. The *Expeditionary Maneuver Warfare* concept and modern Marine aircraft with measurable speed and reach advantages over today's Air Combat Element (ACE) platforms will present new challenges for the ASAR mission. The MH-60S, the replacement helicopter for the aging HH-46D, is a tactical platform with capabilities for the following missions: Maritime Dominance, Logistics, Combat Search and Rescue (CSAR), NSW, and Airborne Mine Countermeasures (AMCM) missions.

The Navy helicopter community has embraced the ASAR mission and now must look forward to determine if the current mission will remain viable in the near future. This paper will determine the feasibility of tailoring the ASAR mission to support the Navy and Marine Corps vision of a forward deployed, combat capable fleet.

**Recommendations :** Implement a four-helicopter detachment into the ATF and expand the ASAR mission to include AMCM, overwater TRAP, NSW, and "Limited" ASUW, AT/FP and SSC roles. Two of the four helicopters would be specifically outfitted for AMCM missions.

## **METHODOLOGY**

Chapter One is the Introduction and background concerning the development of the Amphibious Search and Rescue mission in the Helicopter Combat Support (HC) community and the current missions of the ASAR detachments.

Chapter Two identifies and analyzes the vision and doctrine of the amphibious forces.

Chapter Three identifies the new capabilities that the MH-60S will bring to the fleet. Chapter Three will also address the two major programs affecting the near future of the helicopter force.

Chapter Four will examine the critical missions of the Amphibious Task Force (ATF).

Chapter Five will develop options for the ASAR mission.

Chapter Six will conclude and focus on recommendations.

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## Chapter 1

### CROSSROADS

***Winning in combat is the requirement. Everything else that we talk about contributes to that end.***

***- Admiral Vern Clark  
Chief of Naval Operations***

The Navy helicopter force is at the crossroads. The role of Navy helicopters in the fleet has continued to grow due to their inherent flexibility coupled with emerging technological advancements. The future helicopter force will be based around two variants of the Sikorsky MH-60 aircraft, the MH-60R and MH-60S. The increased capabilities of these two multi-mission helicopters will allow naval commanders to use helicopters in warfighting missions previously executed by fixed wing and surface assets. According to Vice Admiral John B. Nathman, Commander, Naval Air Forces, U.S. Pacific Fleet, “We are going to ask a great deal of our helicopter force. They are going to be a total force asset charged with executing most of the air piece of maritime dominance.”<sup>1</sup> The challenge for Navy leadership is to determine how to capture these emerging technologies and integrate them with Navy/Marine Corps doctrine to achieve a forward deployed, combat ready, and credible force.

One mission that is still in the developmental stage and has not reached its full potential is the Amphibious Search and Rescue (ASAR) mission in the Amphibious Task Force (ATF).<sup>2</sup> The ASAR mission has developed in piecemeal fashion, based solely on the capabilities of the

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<sup>1</sup> VADM John B. Nathman, “U.S. Military: Sea Change,” interview by John R. Guardiano in *Rotor & Wing*, (October 2001), 39.

<sup>2</sup> Amphibious Task force(ATF) and Amphibious Readiness Group (ARG) are interchangeable.

HH-46D helicopter and is not integrated with the mission requirements of the ATF and the Marine Expeditionary Unit (MEU).

As a result, ASAR detachments have limited capabilities for critical missions in the ATF, including Naval Special Warfare (NSW), Tactical Recovery of Aircraft and Personnel (TRAP), and Anti-terrorism/Force Protection (AT/FP). With the arrival of the MH-60S helicopter and the Navy vision for Airborne Mine Countermeasures (AMCM) within the Carrier Battle Group(CVBG) and ATF, the ASAR mission needs to be analyzed to ensure the mission will meet the future needs of the amphibious forces. This paper will develop the ASAR mission by gaining an understanding of how the mission has evolved, and will identify the future helicopter force structure based on the capabilities of the MH-60S as the ASAR platform. This paper will also demonstrate how these new capabilities can be integrated with the doctrine and vision of the Navy and Marine Corps to develop a cohesive ASAR mission that enhances the overall effectiveness of the ATF.

## **AMPHIBIOUS TASK FORCE**

The typical ATF is composed of a three amphibious ships and a Marine Expeditionary Unit (Special Operations Capable) (MEU(SOC)). The MEU(SOC) units, consisting of approximately 1,500 Marines, are Special Operations capable in that they provide enhanced capabilities, such as specialized demolition operations, clandestine reconnaissance and surveillance raids, and in-extremis hostage recovery.<sup>3</sup> The MEU(SOC) is task organized to provide a forward deployed presence and is designed to be the Marine Corps' first-on-the-scene

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<sup>3</sup> U.S. Marine Corps, *U.S. Marine Corps Doctrinal Publication(MCDP) 3, Expeditionary Operations* (Washington, D.C.: Headquarters, U.S. Marine Corps, 1998), 75.

force.<sup>4</sup> A complete listing of MEU(SOC) capabilities is located in Figure 1<sup>5</sup>. The mission of the ATF is crucial to the expeditionary capabilities of the United States Navy now and will remain so in the future.

Amphibious forces are designed and trained to project combat power from the sea against hostile land-based forces. They are highly maneuverable, self-sustaining, and unencumbered by territorial restrictions...The inherent mobility, sustainability, and responsiveness of the amphibious forces provide the NCA with an extraordinary tool with which to implement US foreign policy and a rheostat by which US commitment can be increased to influence potential crises.<sup>6</sup>

The role of the amphibious forces will continue to be even more relevant to the strategic goals of the United States, as the Navy continues to increase the “brown” water or littoral capabilities of the fleet.

Amphibious Raids	Show of Force
Limited Offensive Attacks	Reinforcement
In Extremis Hostage Recovery	Civic Actions
Mobile Training Teams	Electronic Warfare
Initial Terminal Guidance	Recovery Operations
Humanitarian Assistance	Human Intelligence
Visit, Board, Search, and Seizure	Security
Specialized Demolition Operations	Counterintelligence
Gas and Oil Platform Operations	Airport/Port/Key Facility Seizure
Noncombatant Evacuation	Tactical Recovery of Aircraft and Personnel
Military Operations in Urban Terrain	Fire Support Control
Signals Intelligence	

Figure 1: Table of MEU(SOC) Missions

## **ASAR DEVELOPMENT**

The Fleet Combat Support Helicopter (HC) community has been performing the ASAR

<sup>4</sup> U.S. Marine Corps, *Marine Corps Strategy 21* (Washington, D.C.: Headquarters, U.S. Marine Corps, 2000), 4.

<sup>5</sup> Galdorisi, George, CAPT, USN (ret), “Expeditionary Forces at the Crossroads,” *US Naval Institute Proceedings*, (June 2001), 35.

<sup>6</sup> U.S. Navy, *Naval Amphibious Warfare Plan, Decisive Power from the Sea* (Washington, D.C.: Department of the Navy, 1999), 12. Cited hereafter as NAWP.

mission in the ATF since 1992. Currently, HC squadrons deploy two HH-46D helicopters as a detachment consisting of 6 pilots and approximately 25 maintenance technicians. The helicopters are based and supported onboard the large deck amphibious ship, either a LHD class or LHA class, within the ATF. The primary mission of the ASAR helicopter detachment is to provide continuous Amphibious Search and Rescue coverage for the ATF. The secondary missions are Naval Special Warfare (NSW) and Logistics support in the form of Passenger/Mail/Cargo (PMC) and Vertical Replenishment (Vertrep).<sup>7</sup>

The current mission for Navy helicopters in the ATF has developed in piecemeal fashion for a variety of reasons. The limited capabilities of the platform, a lack of funding to conduct the required training for the mission, and the initial reluctance on the part of the HC community to accept the ASAR mission were all contributing factors for this piecemeal development. The result has been the development of the ASAR mission based solely on the capabilities of the HH-46D, instead of an integrated approach coordinating the platform capabilities with the mission requirements of the ATF and MEU.

There was a lack of vision and limited funding to develop the ASAR mission until the HC community took ownership of the ASAR mission. In comparison to the development of the carrier SAR mission, the ASAR mission is strikingly different for a number of reasons. Primarily, the Helicopter Anti-Submarine (HS) community leadership has been able to find ways to integrate helicopters into the carrier mission, resulting in SAR helicopters conducting Undersea Warfare (USW) and Combat Search and Rescue (CSAR), in addition to the plane guard mission. With HC community ownership of the ASAR mission, the mission has rapidly developed to now include Night Vision Goggle (NVG) qualified crews capable of conducting NSW and limited TRAP missions.

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<sup>7</sup> HC-8 Detachment TWO End of Cruise Report, 13May99, 3.

United States Marine Corps *Lessons Learned* reports are evidence to this fact. In 1990, the ATF had to rely on a single Navy UH-1N or an ACE helicopter asset for SAR support, neither of which was night/adverse weather capable.<sup>8</sup> By 1992, the HC community was providing one HH-46D helicopter to each deploying ATF. During a fleet training exercise in 1992, Amphibious Squadron ONE reported that one HH-46 “proved inadequate for continuous assigned operations. The single HH-46 assigned, maintained an 82 percent (9 of 11 nights) availability rate, flying night SAR and limited PMC missions.”<sup>9</sup> To ensure the Air Combat Element (ACE) completed all of its night flight operations, the ACE and the ATF ships had to compensate for the lack of an additional HH-46D. When the single HH-46D was not available for SAR, either another ATF ship was diverted from other missions to perform plane guard duties or ACE helicopters covered SAR duties. These additional duties effectively reduced the flexibility of the ATF to conduct simultaneous operations. Amphibious Squadron ONE recommended the assignment of a two-helicopter SAR detachment for all future ATF deployments.

By 1993, two helicopters were assigned to each deploying ATF, but the ASAR crews were not NVG qualified. During a WESTPAC deployment in 1993, the ACE flew 70 percent of their nighttime flight hours on NVGs. Often times, ACE aircraft were conducting NVG operations in the same airspace with ASAR crews who flying unaided. This disparity caused numerous aircraft separation safety issues and disrupted the launch and recovery cycles due to flight deck lighting configuration differences for NVG and non-NVG flight operations. The embarked Amphibious Squadron Commander for this exercise remarked, “having a fully

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<sup>8</sup> U.S. Marine Corps Lessons Learned Report, WESTPAC 90-1, 12 July 1990, 1.

<sup>9</sup> Navy Lessons Learned Report: Amphibious Squadron ONE, 07 July 1992, 1.

integrated NVG aircrew and cockpit would provide improved night SAR capabilities and possibly some [NSW] warfare enhancement for the [ATF].”<sup>10</sup>

This snapshot may leave the impression that the Marines drove the development of the Amphibious Search and Rescue mission to meet their mission requirements with little help from the Navy. While that may have been true initially, the HC community encountered difficulties balancing the requirements for the ASAR detachments in addition to the established Logistics Force ships detachments. The biggest hurdle for the HC community has been acquiring the HH-46, the doppler radar equipped variant of the H-46. A coupled doppler radar enables the pilot to safely maintain a night overwater hover and is a requirement for night SAR operations. As of 2001, only 50 percent of the H-46 fleet was capable of conducting the ASAR mission.<sup>11</sup>

The HC community addressed many of these deficiencies and by 1994, ASAR detachments were providing round the clock day/night SAR coverage for the Amphibious Task Force with all crews fully qualified to conduct Night Vision Goggle NSW missions with embarked SEAL or EOD units. A typical HC detachment flies approximately 120 hours per month in support of the ATF operations. While most of the hours are flown in support of SAR operations, the rest of the hours are divided between PMC, NSW, and training missions.

The Navy helicopter community has embraced the ASAR mission and now must look forward to determine if the current mission will still be viable in the near future. The current ASAR mission is not integrated with the mission/doctrine of the amphibious forces and will not fully exploit the multi-mission and tactical capabilities of the MH-60S helicopter, which will enter the fleet in 2003. The Navy must recognize and integrate the capabilities of the MH-60S

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<sup>10</sup> Navy Lessons Learned Report, Amphibious Squadron TWO. 24 August 1993, 1.

<sup>11</sup> U.S. Navy, Operational Requirements for a Multi-Mission Combat Support (HC) Helicopter ATAC 1C, 3. Cited hereafter as ORD.

with the vision and doctrine of the amphibious forces to define the ASAR mission and to develop procedures to perform the stated mission requirements.

## Chapter 2

### AMPHIBIOUS DOCTRINE

***Opportunities and challenges in the world's littoral regions will increase America's reliance on the continuous forward presence and sustainable maritime power projection of Naval expeditionary forces. Those forces will promote national interests, influence vital regions, and fight and win the Nation's battles.***

***- Marine Corps Strategy 21***

The mission of the ASAR detachment is to support the Amphibious Task Force; therefore, an understanding of the overall missions of the MEU(SOC) and the Amphibious Task Force is fundamental to developing a cohesive mission plan for ASAR.

According to the Marine Corps capstone concept document, *Expeditionary Maneuver Warfare*, the mission of the MEU(SOC) in the early 21<sup>st</sup> century is "to be the on-scene/on-call enabler for follow-on Marine or joint forces."<sup>12</sup> The Marine Corps expects and is planning for many of these operations to take place in the littorals.<sup>13</sup> The MEU(SOC), because of its special training and equipment, will be able to operate across the entire spectrum of conflict from humanitarian assistance to Major Theater War (MTW).

The salient requirement of an amphibious assault is the necessity for swift, uninterrupted buildup of sufficient combat power ashore from an initial zero capability to full coordinated striking power as the attack progresses toward amphibious force objectives. To achieve success, an amphibious force should be assured of maritime superiority against enemy surface and subsurface forces at sea, air superiority throughout the operational area, and a substantial superiority over enemy forces ashore.<sup>14</sup>

At the operational level, the Marine Corps will use Operational Maneuver From the Sea (OMFTS), Ship to Objective Maneuver (STOM), and Seabasing concepts in planning to execute the strategic concept of Expeditionary Maneuver Warfare. Marine Corps doctrine is based on

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<sup>12</sup> U.S. Marine Corps Capstone Concept Paper, *Expeditionary Maneuver Warfare*, (Washington, D.C.:Headquarters, U.S. Marine Corps), 7. Cited hereafter as EMW.

<sup>13</sup> U.S. Marine Corps, *United States Marine Corps Warfighting Concepts for the 21<sup>st</sup> Century*.(Quantico, VA : Marine Corps Combat Development Command, Concepts Division, *n.d.*), .I-4. Marine Corps assumption based on the fact that the littorals are home to over 3/4 of the world's population, 80 percent of the world's capital cities, and most of the trade marketplaces.

<sup>14</sup> Joint Chiefs of Staff, Joint Pub 3-02, *Joint Doctrine for Amphibious Operations*.(N.p., 19 September 2001),1-4.



the use of the sea as a maneuver space and base from which to project power ashore.<sup>15</sup>

According to the Marine Corps, “Seabasing operations will capitalize on the maneuver space afforded by the sea, rapid force closure through at-sea arrival and assembly, and the protection assured by the U.S. Navy’s control of the sea.”<sup>16</sup> The focus of Marine strategy is on the assault and operations ashore using speed, stealth, precision, and sustainability to influence events in the littorals.<sup>17</sup>

The future amphibious forces will be vastly different in terms of capabilities than today. For a major amphibious operation today, the ACE would use the CH-46E and the CH-53E for troop movement, the AV-8B, AH-1W, and carrier based F/A-18C for Close Air Support. To successfully execute the Expeditionary Warfare Concept in a future war, the ACE will be using the MV-22 in place of the CH-46E for troop transport and the Joint Strike Fighter (JSF) (STOVL) in place of the AV-8B for CAS.<sup>18</sup> Not only do the MV-22 and the JSF (STOVL) offer a distinct speed advantage, more importantly, they have a significant reach advantage. The JSF (STOVL) is scheduled to have a 450 nautical mile combat radius profile compared to the AV-8B combat radius profile of approximately 150 nautical miles without drop tanks; the MV-22 is planned to have five times the reach of the CH-46<sup>19</sup>. The effect of these advantages will be an amphibious force that with the ability to launch from Over the Horizon (OTH) when taking the fight to the enemy.

Even though the MEU(SOC) will have the capability to conduct missions from OTH, there will still be a clear requirement to maneuver naval forces into the littorals to influence

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<sup>15</sup> EMW, 5.

<sup>16</sup> EMW, 5.

<sup>17</sup> EMW, 5.

<sup>18</sup> The MV-22 is a V/STOL medium lift assault, self-deployment, and sustained land operations capable air vehicle. The JSF (STOVL) is the next generation, strike aircraft weapon platform.

<sup>19</sup> Naval Aviation Systems Command, V-22 Osprey page, [URL:<www.navair.navy.mil/products/product.cfm?id=32>](http://www.navair.navy.mil/products/product.cfm?id=32), accessed 19 December 2001.

events ashore. Operating in the littorals increases the threat from naval mines, shore based anti-ship missiles, and enemy air interdiction to amphibious forces. The mine threat is particularly a major concern of the Marine Corps. The “Concept for Future Naval Mine Countermeasures in Littoral Power Projection”, a combined Navy and Marine Corps doctrinal concept paper, identifies the fact that low-tech naval mines can stop any amphibious operation unless they can be located, identified, and neutralized. The capability to detect and identify the mine threat will allow amphibious planners to exploit the enemy either by avoiding the mines and obstacles or by rapidly breaching them to project power ashore.<sup>20</sup>

The Naval Amphibious Warfare Plan (NAWP) lays out the roadmap for future amphibious forces.

The essence of the operational concept for amphibious forces is forward presence and the ability to operate effectively across the full spectrum of conflict and a vast array of crises....The basic elements of the operational concept are forward deployed forces, augmentation by prepositioned and surge forces, seabasing, and the principle of operational maneuver from the sea.<sup>21</sup>

To achieve this vision, the Navy has embarked on an aggressive modernization plan for ships, aircraft and Command/Control/Communications/Computers & Information (C4I) systems. The Amphibious Task Force “of the 21<sup>st</sup> century will have enhanced lift, more speed, better agility, and the ability to handle a more diverse range of missions. They are designed to work together as a cohesive entity, but individual ships—particularly newer ships such as the LPD-17—also are capable of independent operations.”<sup>22</sup>

Both Marine Corps doctrine and the NAWP are integrated in their approach to future development, but, more interesting than what is stated in the documents is what is not addressed.

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<sup>20</sup> U.S. Marine Corps, "Concept for Future Naval Mine Countermeasures in Littoral Power Projection," in *United States Marine Corps Warfighting Concepts for the 21<sup>st</sup> Century*, (Quantico, VA : Marine Corps Combat Development Command, Concepts Division, *n.d.*), X-4.

<sup>21</sup> NAWP, 12.

<sup>22</sup> Galdorisi, 35.

Marine Corps doctrine and mission statements make no specific mention of the following critical aviation missions in the ATF:

1. Search and Rescue (SAR)
2. Logistics (Passengers/Mail/Cargo)
3. Maritime Dominance: (Surface Search Control (SSC), Anti-Surface Warfare (ASW), Anti-Surface Warfare (SUW), and Anti-Terrorism/Force Protection (AT/FP))
4. Airborne Mine Countermeasures (AMCM)
5. Naval Special Warfare (NSW)

The NAWP lists all of the missions and future capabilities of the amphibious forces, yet fails to mention the ASAR mission. The NAWP does not address the supporting role of Navy helicopters, even in missions such as SAR, Logistics, and Naval Special Warfare, which ASAR detachments have historically conducted. More importantly, the NAWP does not include Navy helicopters in any future role for the ATF. According to the NAWP, the ATF in 2010 will be a “more capable and adaptable force, rapidly deployable, and able to operate independently, as an element of a larger naval expeditionary force, jointly, or in a combined or coalition environment.”<sup>23</sup> This document specifically mentions the critical role of Naval Special Warfare, Logistics, Mine Warfare, Battlespace Dominance, and Force Protection missions in the future ATF, but does not associate any of these missions with the MH-60S, even though this airframe will have significant capabilities in each of these mission areas. Instead the focus of the NAWP is on expensive surface technology, such as LPD-17, the Advanced Seal Delivery System (ASDS), Maritime Prepositioning Force (MPF), Ship Self-Defense System, and surface/UAV Mine Countermeasures to support the Amphibious Task Force.

While these are all important programs with significant capability, the NAWP is ignoring a capability that is already inherent in the ATF - the capability of the ASAR detachment. Not only will the ASAR detachment, flying the MH-60S, be able to fulfill some or all of these mission areas, they will offer lethality and greater flexibility to the Amphibious Task Force at a

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<sup>23</sup> NAWP, 16.

significant cost savings over these other platforms. By 2005, the MH-60S is scheduled to be fully integrated into the Amphibious Task Force with the capability for AMCM and NSW.<sup>24</sup>

Naval planners are also exploring the possibility of deploying a surface combatant with two embarked MH-60R helicopters with the ATF to provide enhanced air defense, surface warfare, and undersea warfare capabilities.<sup>25</sup> While this is a superb concept, one wonders if it is realistic with the current high operational tempo (OPTEMPO) of surface combatant ships. The possibility exists that an Aegis class cruiser or Arleigh Burke class destroyer from the CVBG may augment the Amphibious Task Force for specific missions, but neither ship is currently scheduled to be permanently assigned to the ATF.

Fortunately, the LPD-17 class ship and the MH-60S helicopter offer increased survivability and tactical capabilities to the ATF and are capable of assuming additional missions previously conducted by other Navy forces. The LPD-17 class ships will have significantly increased air and surface defenses over current LPD and LSD class ships, and with the exception of USW, the MH-60S will be capable of performing many of the same missions of the MH-60R. Combining the capabilities of these two platforms does not match the capabilities of an Aegis class cruiser, but they may offer an acceptable tactical capability to allow autonomous operations with increased survivability and self-defense capabilities over today's Amphibious Task Force.

Using Marine Corps Doctrine and the Naval Amphibious Warfare Plan one can determine the following concerning the ASAR mission:

1. Increased ranges for SAR aircraft will be required to effectively provide SAR for the MV-22 and JSF.
2. Assigned MCM is required to meet the requirements of Operational Maneuver From the Sea.
3. US Marine reliance on naval forces to provide Maritime Dominance missions.

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<sup>24</sup> U.S. Navy Airborne Mine Defense Program Office (PMS210), "Concept of Employment (CONOE) for Assigned Airborne Mine Countermeasures (AMCM) Systems." 27 April 2001, 7. Cited hereafter as Mine CONOE.

<sup>25</sup> Galdorisi, 37.

4. The Amphibious Task Force will be prepared to conduct amphibious operations without support from the carrier battle group; therefore AT/FP requirements need to be met from within the ATF.

The doctrine and vision of the amphibious forces and the Marine Corps lay out the environment in which the ASAR mission will be conducted. The next step in developing the ASAR mission for the future ATF is to analyze the Navy helicopter force structure and the capabilities of the helicopter that will be conducting the ASAR mission.

## Chapter 3

### FUTURE NAVY HELICOPTER DEVELOPMENTS

*Within the context of “From the Sea” and in support of the national military strategy, the [MH-60S] helicopter provides the Navy with a capability to conduct and sustain littoral power projection and peacekeeping/presence operations.*

*- CH-60 Test and Eval Master Plan*

Understanding the helicopter force structure and analyzing the capabilities of the ASAR platform is essential in determining the future of the ASAR mission. Currently, two major plans are driving the future requirements of the Navy helicopter force: the Helo Master Plan (HMP) and the Helicopter Concept of Operations (CONOPS). The Helicopter Master Plan is an acquisition plan aimed at modernizing the helicopter fleet while reducing costs. The CONOPS is designed to reorganize the helicopter force into a more credible and capable warfighting organization that is integrated with the missions of the carrier battle group. The MH-60S helicopter has been acquired through the HMP, but will be in use under the CONOPS.

The Helicopter Master Plan lists the acquisition timeline and integration of the MH-60R and MH-60S helicopters along with follow on systems such as AMCM and Armed Helicopter. The HMP reduces the different Type/Model/Series of helicopters from eight to three, reduces the associated infrastructure cost of multiple helicopter models, and modernizes an aging helicopter fleet.<sup>26</sup> “The resulting force will be both more capable and less expensive than the existing helicopter force due to necking down the number of helicopter types.”<sup>27</sup> The HMP provides the platforms that will be realigned in the CONOPS plan.

The CONOPS is designed to realign the Command and Control structure to better operationally support the carrier air wing and sea combat commanders by aligning all helicopters in the carrier battle group under a single commander, instead of the current structure where

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<sup>26</sup> Adley, Scott LCDR, USN, Rotary Wing Projects Overview Brief.

<sup>27</sup> Ruskin, David M., Dittmer, David L., Ebert, CDR Joseph G., Perin David A., *Future Helicopter Force Requirements Analysis*, (Center for Naval Analyses, February 2000), 15. Cited hereafter as CNA.

helicopter detachments from different squadrons are spread throughout the battle group and are under the control of the individual ship Commanding Officers.<sup>28</sup> The ASAR detachments will continue to be assigned to the Amphibious Task Force from Expeditionary Squadrons but will be integrated with the command element in the carrier battle group. This plan meets the Navy's vision of having MH-60R and MH-60S helicopters handle all Maritime Dominance (SUW/USW/SSC), logistics, SAR, and AMCM missions for the entire fleet.<sup>29</sup> To accomplish this monumental task, the plan breaks down the current force structure of HC, HS, HSL, and HM squadrons into two squadron types; carrier based squadrons and expeditionary squadrons. The plan is based on two requirements for the MH-60. First, Armed Helo kits will be funded and available to all MH-60 helicopters. Second, technology will continue to develop to support the MH-60S capability to conduct the Airborne Mine Countermeasures mission. This capability is still in the developmental stage. If successful, the flexibility and lethality of this new helicopter force over that of any adversary supports the Navy's vision to use helicopters as a "total force asset."<sup>30</sup> In effect, the new helicopter force will consist of multi-mission qualified pilots flying multi-mission capable aircraft who will be closely integrated with the warfighting functions of the fleet.

#### **HH-46D/MH-60S COMPARISON**

The current ASAR platform, the HH-46D, entered the fleet in the 1960s. Its original service life of 10,000 flight hours has been exceeded by 57 of the current 71 airframes in inventory. To meet near term fleet requirements, the service life has been extended to 12,500 flight hours and 15,000 flight hours on a case-by-case basis.<sup>31</sup> The Operational Requirements

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<sup>28</sup> Shaping the Helo Force Brief. Author unknown. Provided by CAPT. Thomas Barns, OPNAV N780, 10.

<sup>29</sup> Shaping the Helo Force Brief, 10.

<sup>30</sup> Nathman interview, 39.

<sup>31</sup> ORD, 2.

Document (ORD), a publication that defines the operational parameters of a proposed platform, also identifies the following deficiencies in the H-46 platform to justify a replacement aircraft:

1. Inadequate performance. The operating radius of 50 nautical miles limits its ability to be an effective SAR asset.
2. Inadequate night/adverse weather capability. Only 50 percent of the inventory unable to sustain a doppler coupled hover. HH-46D is not all weather capable, because it is prohibited from flying in icing conditions.
3. No aircraft combat survivability. HH-46D has no threat detection or countermeasures dispensing systems.
4. Unacceptably high maintenance and inspection tasks. The HH-46D Maintenance Man Hour per Organizational Flight Hour rate has risen 11% over the past two years.
5. High engine failure rate. Five of last eight Class A mishaps were caused by engine failure.
6. Deficient C4ISR Architecture. HH-46D has no capability for Over the Horizon, datalink or battle force situational awareness.<sup>32</sup>

The replacement helicopter for the H-46, known as the MH-60S multi-mission helicopter (Figure 3<sup>33</sup>), can perform all of the missions of the H-46, from Amphibious Search and Rescue to battlegroup vertical replenishment. The MH-60S can do this at an expected cost of less than half that of the H-46D, with 80 percent fewer mission aborts, 56 percent fewer component removals, and 58 percent unscheduled maintenance actions.<sup>34</sup> The initial version of the MH-60S, known as Block One, will be a utility version to fill the near-term critical need for a replacement utility helicopter for VERTREP and SAR missions for the HC community. Accordingly, the Block One MH-60S will not be designed to operate in a threat environment. The systems required for Combat Search and Rescue, Naval Special Warfare, and Airborne Mine Countermeasures missions will be incrementally added to the basic MH-60S platform as funding permits.<sup>35</sup>

The immediate advantage of the MH-60S over the HH-46D is its increased reliability.

While the HH-46D is a capable platform, its reliability has been in question for some time and

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<sup>32</sup> ORD, 3.

<sup>33</sup> U.S. Navy PMA 299 (Multi-mission Helicopter Program Office), MH-60R/S Program Brief Overview Brief, 4.

<sup>34</sup> Sikorsky Helicopter Company, URL:<[www.sikorsky.com](http://www.sikorsky.com)> MH-60S page. Accessed 08 August 2001.

<sup>35</sup> ORD, 3. The ORD identifies a requirement for the MH-60S to have ability to leverage off existing systems.



has resulted in a lack of confidence in the safety of the aircraft. These concerns have crept into squadron SOPs, which have conservatively decreased operating ranges and take into account the possibility of engine problems and the potential need for precautionary landing sites.

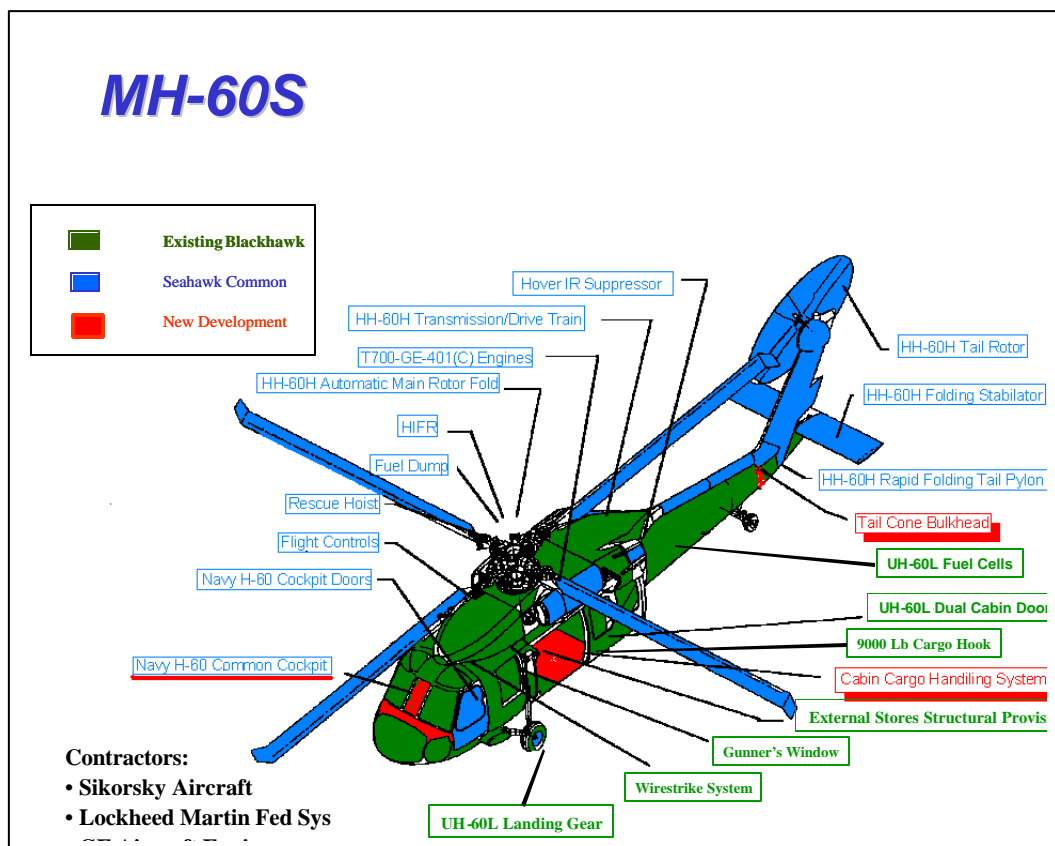


Figure 3: MH-60S Diagram

A comparison of the capabilities between the HH-46D and the MH-60S is detailed in Figure 4. The MH-60S certainly addresses the five concerns of the HH-46D listed above, but in the initial configuration, the MH-60S helicopter has less internal cabin space, has a more restrictive wind envelope for VERTREP, and does not address the critical endurance limit of the HH-46D. Both the HH-46D and the MH-60S have an endurance of 2.0 hours, based on a 70 knot profile and landing with a minimum of 20 minutes fuel reserve. In terms of a SAR scenario, the MH-60S will have the capability to transit 50 nautical miles at max continuous power to its search area datum, search for 30 minutes, descend to deploy a SAR swimmer and

maintain Hover Out of Ground Effect (HOGE) for 30 minutes, then return to ship at maximum continuous speed.<sup>36</sup>

Figure 4: MH-60S/HH-46D Comparison

Parameter	HH-46D <sup>37</sup>	MH-60S <sup>38</sup>	NOTES
Max Gross Weight (internal load)	23,000 lbs.	22,500 lbs.	
Max Gross Weight (external load)	23,000 lbs.	23,500 lbs.	
Endurance (no external tanks)	2 hours	2hours	
Endurance (internal aux tank)	3 hours	2 hours 45 minutes	
Endurance (ESS)	N/A		ESS not funded for MH-60S
Max Payload (Ext)	6,000 lbs.	4,733 lbs	H-46 data based on hook limit
Max Payload (Int)	Dependant on gross weight	5,500 lbs.	H-46 internal load plus takeoff weight cannot exceed 23,000 lbs
Passengers (Max)	20	12	
Max Airspeed	145 knots or CGI	180 knots	H-46 max speed may be lower depending on CGI indicator.
Max Winds (rotor engagement)	20 knots (any direction)	45 knots (any direction)	H-46 limits based on CV/LHD limits.
Max Nr	125%	142%	
Altitude Limitations	10,000 ft	13,000 ft	
Sideward Flight Limit	35 knots	45 knots	
Rearward Flight Limit	30 knots	45 knots	
Max Hovering turn rates	36° per second	30° per second	H-46 rate applies up to 20,800 pounds gross weight
Slope Landing limitations	10° nose-up 6° cross-slope 10° nose-down	9° nose-up 12° cross-slope 6° nose-down	
Phase Inspection interval	100 hours	175 hours	
Weapons	.50 cal machine guns	M240 Machine guns	M240 currently undergoing OPEVAL.

<sup>36</sup> ORD, 5. Figures based on 2 hr endurance limit. ORD identifies ability to maintain HOGE for a 12 person rescue at a rate of 5 minutes per person. This unrealistic figure would take one hour to bring all survivors on board and is not credible based on a 2hr endurance limit (includes 20 minute reserve).

<sup>37</sup> NATOPS Flight Manual, Navy Model H-46D Helicopter, NAVAIR A1-H46AD-NFM-000. 01 December 1997.

<sup>38</sup> NATOPS Flight Manual (Preliminary), Navy Model MH-60S Aircraft, A1-H60SA-NFM-000. 01 August 2001.

	(2)	(2)	52 Armed Helo kits funded. IOC FY05.
Maintenance Man per Organizational Flight Hour rate	30 hours	18.5 hours (HH-60H)	H-46 has 11 % growth rate over past two years.

With an Extended Stores Support System (ESSS) installed, the endurance of the MH-60S will be increased to approximately 4 hours. The ESSS consists of four removable station pylons capable of carrying additional pressurized fuel tanks and/or Hellfire missiles.<sup>39</sup> The ESSS does not affect the cabin space or the ability to hoist survivors. Unfortunately, the ESS will not be available until FY 05 as part of the Armed Helo kit. In the interim, the Navy is evaluating the use of a Robertson –200 internal auxiliary fuel tank to extend the range of the MH-60S. The Robertson –200 will extend the endurance from 2 hours to approximately 3.5 hours with one tank and to approximately 4.5 hours with two tanks.<sup>40</sup> The downside of the internal auxiliary fuel tanks is space. The internal cabin space is reduced by three cubic feet with two internal auxiliary fuel tanks installed.

### **ARMED HELO KITS**

Currently, only 52 kits are funded to cover the needs of the carrier CSAR mission, but OPNAV N780 is working to increase the number of to 89 kits to additionally outfit the ASAR helicopters.<sup>41</sup> If 89 Armed Helo kits reach the fleet, every deployed helicopter with the carrier and the ATF will be armed.<sup>42</sup> The Armed Multi-Mission Combat helicopter will be able to conduct SUW, FP, CSAR, SWS, and SAR missions. The mission kit is planned to incorporate the following components: tactical moving map (TAMMAC), ballistic floor mats, armored pilot

<sup>39</sup> Sikorsky Helicopter Company, MH-60 page. URL: <[www.sikorsky.com](http://www.sikorsky.com)>, MH-60S. Accessed 08 August 2001.

<sup>40</sup> LCDR Robert S. Murphy, USN, NAVAIR PMA 299, Patuxent River, MD. Telephone interview by the author, 09 January 2002.

<sup>41</sup> CDR Kenneth Ryan, USN, OPNAV N780, Washington, D.C. Telephone interview by the author 19 December 2001.

<sup>42</sup> ORD, 3.

seats with side wings, a nose-mounted Forward Looking Infrared (FLIR), crew served side suppression weapons, Hellfire missiles, forward firing guns/rockets and will incorporate an integrated self defense (ISD) system. The ISD will include a laser detection system (LDS), a plume detection system (PDS), and a radar warning receiver.<sup>43</sup>

### **MCM CAPABILITY**

The MH-60S is scheduled to have the capability for Airborne Mine Countermeasures (AMCM) by FY 05.<sup>44</sup> The systems currently planned and undergoing testing are:

1. AN/AQS-20/X Acoustic Sonar Mine Detection System
2. AN/AES-1 Airborne Laser Mine Detection System (ALMDS)
3. AN/WSS-1 Organic Airborne and Surface Influence Sweep (OASIS)
4. Rapid Airborne Mine Clearance System (RAMICS)
5. Airborne Mine Neutralization System (AMNS)<sup>45</sup>

“The purpose of the MCM systems assigned to the CVBG and ARG is to provide minehunting, [identification], neutralization, and minesweeping capabilities sufficient for operations limited to the initial breakthrough of Q-routes through potentially mined areas, the clearance of mines in small operating areas and Battle Group protection.”<sup>46</sup> Figure 5<sup>47</sup> visually depicts the equipment employment.

The major advantage of the Armed Helo kit and the AMCM capability is the flexibility they bring to the Amphibious Task Force. Since the kits can be installed at the organizational level, personnel on the ship can configure the helicopters as necessary according to the assigned mission. Even with these kits installed, the MH-60S still retains the ability to conduct Search and Rescue. At the same time, the aircraft will have much improved survivability characteristics, allowing it to be operated in an increased threat environment.

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<sup>43</sup> U.S. Navy, Test And Evaluation Masterplan For Fleet Combat Support Helicopter (Ch-60) temp no. 1552, (23 Apr 98), A-4.

<sup>44</sup> Mine CONOE, 7.

<sup>45</sup> Mine CONOE, 9.

<sup>46</sup> Mine CONOE, 7.

<sup>47</sup> U.S. Navy, PMA 299 (Multi-mission Helicopter Program Office), MH-60R/S Program Brief Overview Brief, (n.d.), 10.

If the MH-60S is incorporated into the fleet with the current mission of the ASAR detachments, the greatest advantage is that the ATF will now have qualified crews flying a safer, modernized SAR platform. The increased reliability and decreased costs of the airframe answers the HMP requirements and enhances the mission of the ASAR detachment, but does not necessarily incorporate the MH-60S as a “total force asset,” as envisioned in the CONOPS plan.

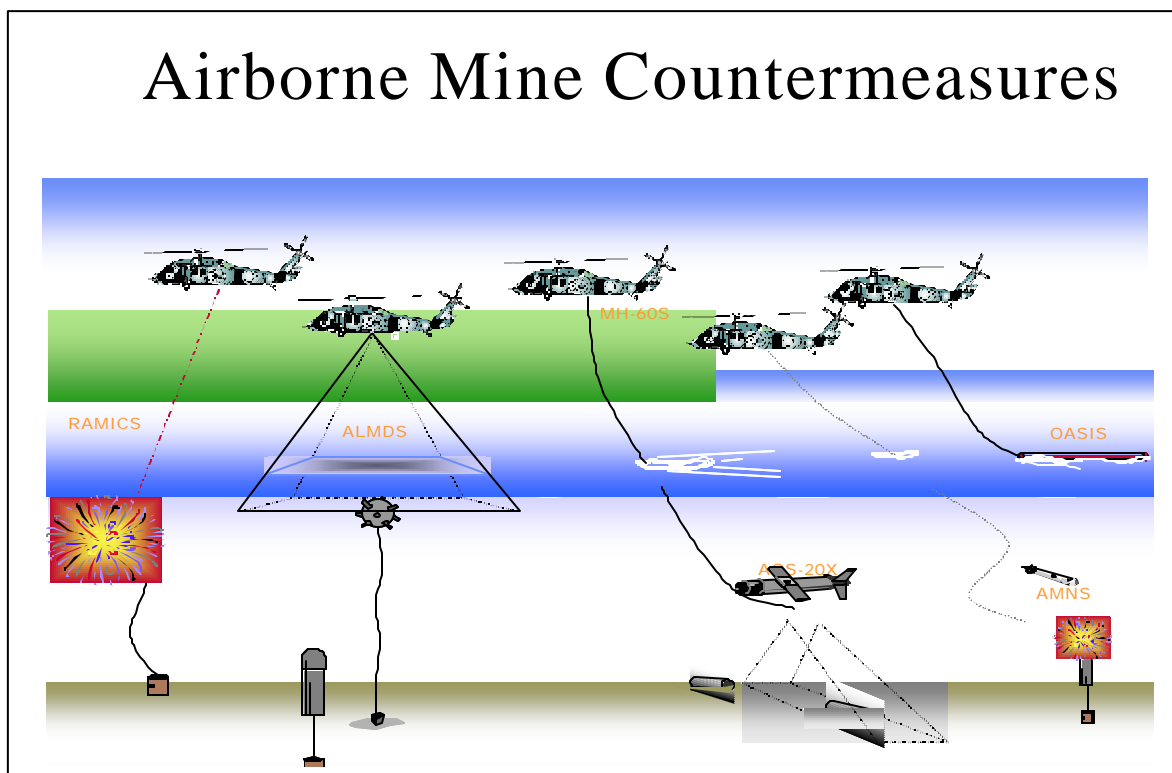


Figure 5: MH-60S AMCM Capabilities

## Chapter 4

### ASAR MISSION ANALYSIS

The challenge is to determine which capabilities of the MH-60S are applicable to the ASAR mission and can be incorporated to develop a cohesive mission that is integrated with the vision and doctrine of the ATF. Developing the future ASAR mission requires certain assumptions to be made. The following assumptions are used as a guideline for ASAR mission development:

1. Future ATF will consist of three ships (LHD, LPD, LSD).
2. MH-60S Armed Helo kits will be funded and installed on all deployable MH-60S helicopters.
3. Organic AMCM vision becomes a reality in some form.

The current ASAR mission will be used as a starting point for developing the future ASAR mission. The Required Operating Capabilities and Projected Operational Environment (ROC/POE) document for HC squadrons lists the capabilities required to conduct certain missions in different operating environments. This document identifies the missions and is used to determine appropriate funding and manpower requirements for each community.<sup>48</sup> Identified missions are further categorized according to capability, either “Limited” or “Full,” in specific operating environments. “Limited” capability means the capability is only partially realized either due to lack of proper equipment or training.<sup>49</sup> “Full” capability means the capability can be fully achieved and is supported with the proper personnel and equipment required. In terms of the ROC/POE, HC squadrons have “Full” capability in SAR and Logistics missions, and “Limited” capability in Naval Special Warfare (NSW), Tactical Recovery of Aircraft and Personnel (TRAP), Undersea Warfare (USW), Surface Search and Control (SSC), and Mine

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<sup>48</sup> U.S. Navy, OPNAV Instruction C3501.233D, “Required Operational Capabilities (ROC) and Projected Operational Environment (POE) for Fleet Squadrons (U),” (Washington, D.C.: Department of the Navy, December 1999), 1. Cited hereafter as ROC/POE.

<sup>49</sup> ROC/POE, 3.

Countermeasures (MCM) missions. Historically, Logistics and SAR have been the primary missions of the ASAR detachment in the ATF. Those missions will remain in the future but different procedures and operating limits will need to be employed specifically for the MH-60S.

In relation to the HH-46D, the decreased internal cabin space in the MH-60S will have the greatest effect on ATF logistics. The logistics problems can be overcome; however, the solution lies in different methods of employment. To make up for the decreased internal cabin space, either increased sorties will be required to do the same missions internally or external loads will become the preferred transport method for cargo. It may be argued that the passenger transfer mission will require more sorties due to the decreased number of passenger seats in the MH-60S (14 in a MH-60S vs. 18 in a HH-46D). Even though current ASAR detachments transport an average of 1,056 passengers per deployment, most passenger missions do not contain the maximum number of passengers.<sup>50</sup>

The SAR mission will be significantly enhanced with the advanced equipment such as FLIR, improved coupled doppler radar, and GPS in the MH-60S. With the addition of auxiliary fuel tanks on the MH-60S, the Amphibious Task Force immediately has a viable platform that will meet the SAR requirements of the future.

While Logistics and SAR are understood to be the primary missions of the ASAR detachments, other mission areas that the MH-60S will have capabilities for need to be analyzed to determine the feasibility of including them in the ASAR mission. The following mission areas will be analyzed: TRAP, AMCM, Maritime Dominance and NSW.

### **TRAP**

An extension of the SAR mission that is specific to the ATF is the overwater Tactical Recovery of Aircraft and Personnel (TRAP) mission. According to the JCS Pub 3-50.2,

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<sup>50</sup> Data compiled from HC-8 End of Cruise Reports

*Doctrine for Joint Combat Search and Rescue*, “Each service and the U.S. Special Operations Command are responsible for performing Combat Search and Rescue (CSAR) in support of their own operations.”<sup>51</sup> The CSAR mission is the recovery of distressed personnel during war or military operations other than war and requires specific training and qualifications for aircrews.<sup>52</sup> The HS community based on the carrier conducts CSAR for the Navy. Since ASAR detachments are not trained in CSAR, the U.S. Marine Corps meets this requirement with the TRAP mission. The TRAP concept emphasizes detailed planning and the use of assigned and briefed aircrew and combat Marines “to affect the expeditious return of personnel, equipment, and/or aircraft without further loss of friendly forces.”<sup>53</sup>

The MEU commander uses the TRAP Decision Matrix (Figure 6<sup>54</sup>) to determine basic go or no-go criteria for any recovery mission. Additionally, he must decide if the mission will be an “Immediate” recovery or a “Delayed” recovery mission, based on the environment, threat, and level of planning required for the mission.

The Decision Matrix contains a Safe (overwater) category that requires the Air Combat Element and the Ground Combat Element for assets and “standard” training for required tactics. The U.S. Marines always assume that a low threat environment exists at a minimum rather than a benign, or no threat, environment, because the possibility of hostile actions always exists.<sup>55</sup> Since survival time is the key to any overwater rescue, any recovery in a low/medium threat overwater environment should fall into the “Immediate” recovery category for TRAP.

According to the MAWTS-1 Trap Planning Manual, “Marine TRAP crews may be required to conduct an overwater pickup in contested open ocean or within the coastal waters of

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<sup>51</sup> Joint Chiefs of Staff, Joint Pub 3-50.2, *Doctrine for Joint Combat Search and Rescue* (n.p., 26 January 1996), I-1. Cited hereafter as JCS, Joint Pub 3-50.2.

<sup>52</sup> Joint Chiefs of Staff Publication 3-50.21, GL-4.

<sup>53</sup> Marine Aviation Weapons and Tactics Squadron One (MAWTS-1), TRAP Planning Student Handout, (15 August 2000), 15. Cited hereafter as MAWTS-1 TRAP Planning Student Handout.

<sup>54</sup> Joint Pub 3-50.2, C-3.



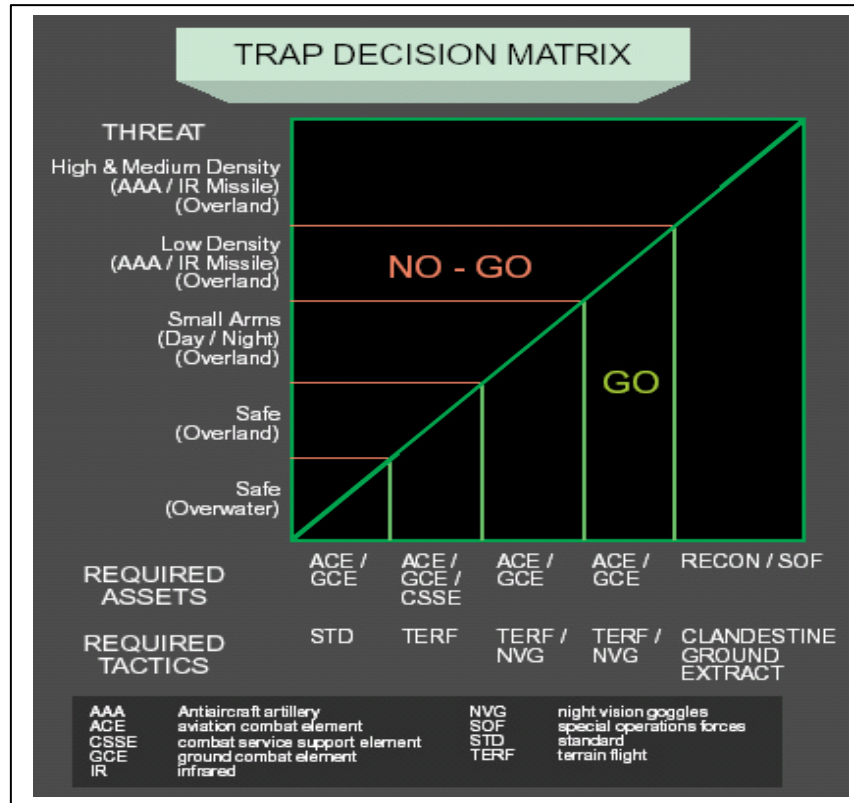


Figure 5: TRAP Decision Matrix

hostile territory.”<sup>56</sup> The recovery asset listed for overwater TRAP is a Marine helicopter even though no Marine helicopters have a doppler radar that is required for night overwater hover capability. The TRAP manual also discusses how the Marine helicopter will be in a prolonged hover to hoist the survivors and/or deploy a rescue swimmer.

Although not listed in the JCS Pub or in the MAWTS Training Manual, Navy HH-46D helicopters have been employed in overwater TRAP packages. The MEU commander approves the TRAP packages for various scenarios that will be employed during each deployment. Many MEU commanders list the HH-46D as the overwater recovery asset. In 1994, the 24 MEU identified the Navy HH-46 D as the primary recovery asset in the TRAP Alpha (day overwater) and TRAP Bravo (night overwater) packages.<sup>57</sup> The TRAP Alpha package consisted of a

<sup>55</sup> MAWTS-1 TRAP Planning Student Handout, 11. Low threat environment contains small arms and light optically aimed AAA up to .51 caliber weaponry.

<sup>56</sup> MAWTS-1 TRAP Planning Student Handout, 23.

<sup>57</sup> 24 MEU, ARG TRAP/SAR Capabilities Message, 1.

formation including one HH-46D and one Marine CH-46E capable of executing an immediate response in a low threat environment. The TRAP Bravo package consists of the same aircraft with the addition of one AH-1W or one UH-1N (illumination flare capable) in the formation. In 2000, HC-8 Det One was involved in overwater TRAP scenarios during a Mediterranean deployment. In addition to being the primary recovery asset in a low threat environment, additional plans were developed for an increased threat environment. The plan involved the HH-46D performing a soft duck NSW insertion outside the threat environment. After deploying the raft and SEALs in a benign environment, the SEALs would then perform the recovery and return to a designated pickup point for extraction using the HH-46D.<sup>58</sup>

The primary advantages of the Navy SAR platform over any Marine helicopter in the ATF are:

1. Night Hover capability: The automatic hover capability is a requirement for night overwater hovering.
2. SAR swimmer: SAR swimmers are on board and equipped to enter the water on every SAR flight.
3. NVG capability: NVGs increase the quality of night SAR and also allow for increased safety in night formation flying with the ACE aircraft.
4. Operational hoist: An operational hoist is a requirement for every SAR mission. A Navy ASAR helicopter with an inoperable hoist is Not Mission Capable (NMC). A Marine Corps ACE aircraft is Partial Mission Capable (PMC) with an inoperable hoist since SAR is not their primary mission.
5. Training: All ASAR crews are trained in overwater Search and Recovery procedures and patterns.

In a night rescue scenario, the Marine Corps helicopter would deploy illumination flares in a pattern to be used as a hover reference. Illumination flares are not compatible with NVGs and would likewise increase the probability of hostile action. To affect the rescue, the Marine helicopter would either have to rely on a hoist only recovery or would require a Navy SAR swimmer onboard to conduct the rescue. From an Operational Risk Management (ORM) perspective, the most dangerous aspect of Marines conducting overwater rescue operations is the

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<sup>58</sup> LCDR Craig Wilson, LCDR, USN. HC-8 Maintenance Officer. Interview by the author 03 November 2001.

lack of training. While not the major factor for a day rescue, a night rescue is an inherently dangerous operation requiring precise hovering movements and coordination between the pilots and aircrewmembers.

Since the expeditious return of personnel is the ultimate goal of TRAP, the limited capabilities of Marine helicopters in overwater recovery methods does not make them the ideal recovery platform. The advantages of the Navy SAR aircraft make them the preferred choice for any overwater recovery mission, and with the introduction of the MH-60S, the choice narrows more as the tactical capabilities of the Navy SAR platform will be greatly increased.

To date, there are no formalized agreements between the Navy and the Marine Corps that standardize overwater TRAP packages using the Navy SAR platform as the primary recovery vehicle. More importantly, the Navy SAR asset is currently listed in some ATF plans for overwater TRAP packages in low threat environments, yet there is no formal training process. If there is consensus that the ASAR helicopter is the primary asset for any overwater recovery (i.e.: SAR or TRAP), then it is imperative that the Navy and Marine Corps develop standardized procedures and a training program for overwater TRAP missions.

A worst-case rescue scenario may provide some insight into the requirements for a training program.

**Scenario:** AV-8B pilot ejects along enemy coastline. Position is approximately 50 nautical miles from the ATF. No CVBG assets available.

**Ambient conditions:** Night, low light.

**Threat environment:** Low, possible small boat threat in area.

In this scenario, the most probable rescue plan would be a TRAP package consisting of one HH-46D as the recovery platform, two AH-1W Cobra gunships as the Rescue Escort (RESCORT) platforms, with another HH-46D covering SAR for the TRAP package and also

serving as a backup aircraft.<sup>59</sup> The TRAP package would be flying on NVGs in a combat formation to the rescue area. En-route, the AH-1W helicopters would fire a 20mm cannon test fire pattern per standard operating procedures. Once on scene, the HH-46D conducts the rescue while the AH-1Ws fly an overhead defensive security pattern.

In this scenario, speed is of the essence, so there is no time for a formalized TRAP brief between all the pilots involved. Except for the daily TRAP brief given each morning, TRAP package decisions would need to be made in a timely manner, and most likely, the package would be made up of assets already flying or in an alert status. Without prior training, this scenario could become problematic, especially if any hostile action is encountered during the rescue. Applying ORM, a process used by all naval aviators to identify and reduce risks associated with flight operations, reveals several significant and potentially deadly issues. First, the ASAR crews are not formally trained in evasive maneuvering tactics and U.S. Marine Corps weapons employment procedures. Secondly, the scenario involves dissimilar aircraft flying in formation on NVGs. The lack of formalized training increases the risk associated with an inherently dangerous mission and could easily result in a disaster. The ORM issues raised either justify making any TRAP package, including overwater recoveries, a Marine Corps only operation, or they justify the development of a standardized training plan that integrates the capabilities of the different platforms.

An integrated training plan involving the ASAR detachment and the ACE answers all ORM questions and provides the ATF with a credible overwater TRAP package. The ATF workup cycle begins approximately 6 months prior to deployment and consists of approximately five workups. While the workup schedule already contains numerous requirements and exercises, time is available to implement an integrated TRAP training program. Since the ASAR

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<sup>59</sup> TRAP package may contain a different combination of aircraft providing RESCORT duty for the HH-46D. MEU commander has authority to adjust packages as necessary.

detachments would currently be involved in the above scenario, a training program involving the ASAR crews and U.S. Marine ACE crews must be established to ensure the success of the mission and safety of the aircrews. A training program should be based on a building block approach consisting of:

1. Classroom training with ASAR pilots and RESCORT pilots. Training would review formation procedures, rescue procedures, firing patterns, on-scene RESCORT patterns, and hostile action procedures. Classroom training should also include NSW tactics for SEAL insertion TRAP scenarios.
2. Formation flight training. Once TRAP packages are formalized, formation flights should be conducted with ASAR helicopter and RESCORT aircraft. Day formation flights should precede NVG formation flights.
3. A night overwater TRAP exercise during SOCEX.<sup>60</sup> The exercise would give all crews opportunity to refine employment plans and would give crews opportunity for realistic training prior to deployment.

“Personnel recovery is an issue of national importance. Preserving the lives and well being of U.S. servicemen placed in danger of isolation or capture while participating in government-sponsored activities overseas, is one of the highest priorities of the Department of Defense.”<sup>61</sup> While TRAP is a Marine Corps answer to the individual service CSAR requirements as directed in JCS Pub 3-50.2, integration of the Navy ASAR helicopter into the TRAP packages provides the MEU and the amphibious force commanders with the best combination of assets to successfully recover any personnel in the overwater environment.

## **AMCM**

Naval mines will continue to a threat to naval operations as the fleet operates in the littorals and have dictated the requirement for “responsive, accurate and tailored MCM capabilities continuously available to the naval force commander.”<sup>62</sup> The CONOPS for MCM

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<sup>60</sup> SOCEX: Special Operations Capable final exercise required before MEU becomes MEU(SOC).

<sup>61</sup> <[www.dtic.mil/dpmo/pr/exsum.pdf](http://www.dtic.mil/dpmo/pr/exsum.pdf)>. Accessed 12 November 2001.

<sup>62</sup> Concept for Future Naval Mine Countermeasures in Littoral Power Projection," in *United States Marine Corps Warfighting Concepts for the 21<sup>st</sup> Century*, X-4

operations consists of “assigned” and “supporting” MCM forces. Assigned MCM forces are those MCM forces deployed with the CVBG/ARG and will normally consist of two to four MCM capable MH-60S helicopters. Supporting MCM forces are those MCM forces not assigned or deployed with the CVBG. Supporting MCM forces will be located in the U.S. or forward deployed and will contain MCM ships and additional MCM capable MH-60S helicopters.

Assigned MCM forces can conduct small area MCM operations, commence larger scale MCM operations prior to arrival of supporting MCM forces, and can conduct independent MCM operations. The ability for the CVBG/ATF to have assigned MCM assets greatly enhances the flexibility of naval forces to transit and operate in the littorals without the *immediate requirement* for supporting MCM assets. Assigned MCM assets gives the CVBG/ATF “a capability that can assess and deal with an adversary mine threat—albeit in a limited fashion...while awaiting the arrival of supporting MCM forces.”<sup>63</sup>

While the forces agree on the importance of the assigned MCM force capability of the MH-60S, debate continues about the number of aircraft required and assignment within the CVBG/ARG.

MCM Force-21 recommends putting four “organic” AMCM CH-60 helicopters with the CVBG/ARG. In the absence of a MIW threat, we suggest placing all four on the CVN to contribute to short-handed missions such as plane guard. Of course these, as well as any battlegroup helicopter, could be cross-decked to other ships in the CVBG/ARG as requirements dictate.<sup>64</sup>

Placing four AMCM MH-60S helicopters on the carrier does add MCM capability to the CVBG, but the carrier is not the best place for the MCM helicopters to be based. The ATF has a higher probability of being involved in significant MCM missions than the CVBG, because the ATF operates closer to the littorals than the CVBG and must penetrate any mined area to get their

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<sup>63</sup> Galdorisi, George, CAPT, USN(ret), letter to the editor, *US Naval Institute Proceedings*, (January 2002): 20.

<sup>64</sup> CNA, 56.

forces ashore. With the above setup, the ATF could be supplemented with two of the four AMCM equipped helicopters, along with the crews, maintainers and support equipment for a specific mission.<sup>65</sup> While that may work, a more sensible solution is to permanently base two of those four AMCM equipped MH-60S helicopters on the LHD. The ATF and the carrier may not be in supporting distances of each other at all times; therefore, spreading out the AMCM capability will increase the flexibility of Assigned MCM operations in the fleet. In this way, the AMCM mission can be fully integrated into the ATF where it will most likely be needed, instead of relying on a surge capability from the carrier.

### **MARITIME DOMINANCE:**

Maritime Dominance consists of Undersea Warfare (ASW), Surface Search and Control (SSC), Surface Warfare (SUW), and Anti-terrorism/Force Protection (AT/FP). While the Maritime Dominance mission for helicopters is primarily being assigned to the MH-60R due to its radar, the MH-60S will also have capabilities to provide Maritime Dominance support to the ATF, specifically with SUW and AT/FP. The MH-60S will be lacking the equipment for the ASW mission and can only provide limited assistance for the SSC mission.

For SUW and AT/FP, weapons are the primary requirement for the MH-60S to contribute to these missions. Even without the Armed Helo kit installed, the M240 side suppression weapons can be still used as an effective weapon for the vital area, the designated inner zone to be defended by the force.<sup>66</sup> With an Armed Helo kit installed, the MH-60S can effectively use its Hellfire missiles and forward firing weapons to interdict surface targets that have been

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<sup>65</sup> Mine CONOE, 7.

<sup>66</sup> CNA, 25.

identified as a threat to the ATF. With a link capability, the MH-60S can also be used in coordination with MH-60R and fixed wing assets to conduct the SUW mission.<sup>67</sup>

The AT/FP mission continues to rapidly develop in response to the attack on the *USS COLE* and the September 11<sup>th</sup> bombings. An asymmetric attack on the ATF by an enemy could cripple any amphibious operation, and the risk is a constant possibility. Emergency Defense of the Amphibious Task Force (EDATF) uses elements of the Air Combat Element along with Stinger teams to provide protection against any identified threat to the ATF. The MH-60S, with the Armed Helo kit installed can be a significant asset to be integrated into this force. The MH-60S can specifically deal with any surface threat with its Hellfire missiles and forward firing weapons, while the fixed wing assets and the Stinger teams can focus on any air threats.

Since terrorist threats are constant possibilities, there are certain advantages to using the MH-60S in the AT/FP mission. The main advantage is that the ASAR asset is always onboard the LHD when it is at sea and can provide full time AT/FP protection, whether the ACE is onboard or not. Additionally, ASAR helicopters are either always in an alert status or are airborne, thereby providing short notice protection of the ATF. In short, the MH-60S can be used as a primary AT/FP asset or it can be used to augment other forces and fill any gaps in coverage that an asymmetric enemy may attempt to exploit.

## **NAVAL SPECIAL WARFARE**

Naval Special Warfare (NSW) missions involve the tactical delivery and extraction of personnel and equipment by unconventional insertion methods.<sup>68</sup> NSW personnel in the ATF, consisting of embarked SEAL platoon or EOD detachment conduct missions using the multiple methods including Rappel, Fast Rope, Cast & Recovery, Special Patrol Insertion/Extraction

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<sup>67</sup> CNA, 62.



(SPIE) Rig, Combat Rubber Raiding Craft (CRRC)/Tethered Duck. Currently, the HH-46D has the capabilities for all of these missions and the ASAR aircrews are qualified to perform them, but only in a benign environment due its lack of tactical capabilities and limited survivability characteristics.<sup>69</sup> The MH-60S is also capable to conduct all of these missions, and its superb tactical capabilities and survivability justify a change in the ROC/POE to expand the operating environment to include a low to medium threat environment. The ROC/POE is currently being evaluated to include this change, which would enable ASAR crews to use their training in a real world operation rather than just in training roles.

While the list of capabilities for the MH-60S is certainly impressive, the probability of incorporating all of these missions into the ASAR mission is not realistic, but identifying these capabilities can be used as a basis for future ATF missions. The Navy and the Marine Corps need to balance these mission capabilities against the capabilities of the ACE to determine which missions should be implemented into the ASAR mission to enhance the overall effectiveness of the ATF.

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<sup>68</sup> ROC/POE, 14.

<sup>69</sup> ROC/POE, 5.

## **Chapter 5**

### **ASAR OPTIONS**

Integrating all of the multi-mission capabilities of the MH-60S will exceed the current capabilities of a two helicopter ASAR detachment; therefore, two options, based on the desired end state, will be evaluated to develop the ASAR mission. The options are a two-helicopter detachment and a four-helicopter detachment.

If the desired end state is a simple replacement for the current platform, the answer is simple; maintain the current two-helicopter detachment setup and place the MH-60S in place of the HH-46D. A simple aircraft swap will meet the needs of the current ASAR mission, but does not take advantage of the tactical capabilities of the MH-60S. If the desired end state is to incorporate helicopters into the CVBG/ATF as a “total force asset,” the current ASAR mission needs to be tailored to incorporate some or all of the additional capabilities of the MH-60S and will require an increase in the number of helicopters based onboard the LHD.

#### **TWO-HELICOPTER DETACHMENT**

Within the context of a two-helicopter detachment, there are opportunities to integrate the ASAR helicopter mission into the mission of the ATF, but any additional mission puts a strain on the primary mission of SAR. Training requirements, funding, and currency requirements are also limiting factors for any mission expansion.

Using the current qualifications of ASAR crews, an expanded NSW role and overwater TRAP missions are sensible missions to add to the current ASAR mission with minimal impact on SAR. The ROC/POE currently lists NSW and TRAP as Limited capabilities for the H-46 in a benign threat, overwater environment only. The lack of combat survivability of the H-46 is the main reason the NSW and TRAP missions are listed as “Limited.” With the HH-46D, NSW missions are purely viewed as training missions only. Since these missions are already identified

in the ROC/POE, no changes to this document are required to include these missions in the ASAR mission. Awareness of the capability, standardized training, and procedures with the Air Combat Element of the MEU are the keys to integrating these missions.

Any expansion into the Maritime Dominance missions requires significant training and changes to the ROC/POE. The Surface Search and Control mission (SSC), mission can partially be accomplished using visual, FLIR, Link, and NVGs with the MH-60S. Additionally, Armed Helo kits are not required and the mission can be conducted with “Limited” capability while simultaneously conducting plane guard. Crews are already trained in visual detection and identification, but additional training requirements would have to be added to learn the procedures for FLIR and Link equipment. The downside is that operating as a SSC platform with no capability for attacking a surface target reduces the effectiveness of the mission. An armed MH-60S not only has the capability to detect, identify, and track surface targets, but would also have the ability for the SUW mission: to engage hostile targets with Hellfire and forward firing weapons.

The SUW and AT/FP missions can be added to the ROC/POE with “Limited” capability. In a two-helicopter construct, one MH-60S could be outfitted with the Armed Helo kit to perform the SUW mission, while the other MH-60S could cover the plane guard duties. An armed MH-60S would be a significant weapon system that could either operate as a single weapon platform or combined with Marine helicopters for the AT/FP mission.

In a two-helicopter ASAR detachment, there is no possibility to add the AMCM mission to the mission statement. There are two major roadblocks for integrating the AMCM mission into a two-helicopter detachment. First, the MH-60S needs to be specifically outfitted for the AMCM mission. The second and most significant roadblock is time; AMCM missions are time-consuming missions requiring multiple aircraft. The SAR mission would be unacceptably

degraded during AMCM missions. With a two-helicopter ASAR detachment, AMCM support would have to be provided from the CVBG as a surge force for a specific mission or threat.

After analysis of all mission areas, it is evident that expanding the ASAR mission with a two-helicopter detachment is limited and after a certain point the expansion will adversely affect the primary mission of SAR. The limiting factors for significantly expanding the ASAR mission in a two-helicopter detachment are the excessive flight hours on those two airframes during a deployment and the lack of a backup aircraft for any tactical mission. Once the training requirements are determined for the SSC, ASUW and AT/FP missions, they may also limit any changes in the ASAR mission.

Even with those limitations, the capabilities of the MH-60S platform and the tactical training of the ASAR aircrews still warrant an expansion of the ASAR mission. The following is a revised mission for the ASAR with two MH-60S helicopters:

- SAR: Full
- Logistics: Full
- TRAP: Limited; overwater, low to medium threat environment
- SSC: Limited
- ASUW: Limited
- AT/FP: Limited
- AMCM: Limited. Visual mine search, Mine Pounce

This revised mission retains SAR as the core competency of the ASAR detachment, but also incorporates the tactical capabilities of the MH-60S into the mission, albeit with “Limited” capability only due to only having a single aircraft available to perform any tactical missions, because one aircraft will always be assigned as the primary SAR aircraft.

#### **FOUR-HELICOPTER DETACHMENT**

A four-helicopter detachment gives the ATF the ability to have continuous SAR coverage, while simultaneously having the capability to conduct other critical overwater missions in support of the ATF. The primary additional mission that justifies the two additional

helicopters is the AMCM mission, because it will require two MH-60S helicopters specially outfitted for the AMCM mission. When the AMCM mission not required, those helicopters will be available to conduct any other ATF mission.

The following is a revised mission for the ASAR with four MH-60S helicopters:

SAR: Full

Logistics: Full

TRAP: Limited; overwater, low to medium threat environment

SSC: Limited. No radar

ASUW: Full

AT/FP: Full

AMCM: Full

With a four-helicopter detachment, the ATF will have “Full” capability for the AMCM mission. Including the AMCM mission meets the U.S. Marine Corps and Navy vision for the amphibious forces. With assigned AMCM, the ATF will have the ability to operate autonomously in the littoral regions of the world.

The four-helicopter positively incorporates the MH-60S helicopter as a “total force asset” in the ATF, but the dilemma for the Navy and Marine Corps is deciding whether or not the capabilities of the MH-60S justify the addition of two Navy helicopters into the ATF.

## Chapter 6

### RECOMMENDATION AND CONCLUSION

*The potential payoff from this operational flexibility justifies the effort to meet the associated challenges in training crews for multiple tasks and for managing [MH-60S] in the battlegroup.*

*- Center For Naval Analyses*

It is evident that the multi-mission capabilities of the MH-60S helicopter exceed the current scope of the ASAR mission. The Navy and the Marine Corps must recognize these capabilities and then decide which missions the ASAR detachment should provide for the ATF. Once these critical missions are identified, then the number of helicopters required can be determined.

At a minimum, there are efficiencies that may be captured and incorporated into a two-helicopter detachment that will significantly improve the ASAR mission. Overwater TRAP and NSW missions are two easily identifiable missions that can directly contribute to the success of the ATF without major training and funding requirements. The foundation for the ASAR detachment to conduct these missions has been in place, but the HH-46D has limited their ability to realistically execute these missions. That argument is no longer valid with the improved survivability and tactical capabilities of the MH-60S. Beyond these two missions, additional missions will quickly overcome the capabilities of a two-helicopter detachment and will degrade the SAR mission. Relying on a single helicopter to conduct vital tactical missions where personnel and ships are at risk is not a recipe for success.

To fully incorporate the tactical capabilities of the MH-60S into the ATF will require a four-helicopter detachment. The four-helicopter detachment would give the amphibious forces “Full” capability across the spectrum of conflict, and most importantly, it would meet the vision of the U.S. Marine Corps and U.S. Navy for amphibious forces by providing assigned AMCM capability, AT/FP protection, and the capability to operate autonomously in the littorals. The

tactical flexibility inherent in this arrangement will enable the amphibious force commander to use Navy helicopters as a force multiplier by employing them throughout the ATF.

As part of “Operational Maneuver from the Sea,” the amphibious force commander may disperse the ATF ships, known as split-ARG operations, to support multiple contingency operations. Even with this dispersal of forces, the ASAR helicopters could be split within the ATF to support these simultaneous operations without any degradation of the SAR mission. For example, one or two MH-60S helicopters can be forward deployed on a LPD or LSD to conduct AMCM or NSW mission away from the main body of the amphibious forces prior to an assault or as part of a deception plan. This flexibility will allow the commander to use the sea as a maneuver space and integrates the use of ASAR helicopters as a force multiplier.

While some in the U.S. Navy are be eager to support a four-helicopter detachment, there are some major hurdles to this plan. The first is space available in the ATF. Amphibious ship loading is a zero sum game, because those ships are already at maximum capacity; therefore, adding two additional helicopters along with the associated personnel and equipment will require the removal of the same number of people and different equipment. The second hurdle is integrating the additional ASAR helicopter flight deck spotting and flight hour requirements with the flight hour requirements of the ACE. Flight deck procedures would need to be developed to include the additional helicopters and additional training requirements into flight operations. The third and most important hurdle is approval of the U.S. Marine Corps. The U.S. Marine Corps must determine the importance of the assigned AMCM capability in their concept of “Expeditionary Maneuver Warfare.” Additionally, this process will involve balancing the advantages of the additional helicopters vs. the capabilities of the Marine Corps aviation assets to avoid any mission redundancy.

## **CONCLUSION**

The capabilities of the MH-60S have been identified and analyzed in the context of the vision and doctrine of the amphibious forces and it is evident that the capabilities exceed the current ASAR mission. Now the Navy and the Marine Corps need to determine which, if any additional missions will increase the mission effectiveness of the ATF and the number of Navy helicopters required to conduct those missions. Once those ASAR mission requirements have been determined, then the tactics and procedures can be developed and integrated into the Amphibious Task Force.

Some may argue that any major changes to the ASAR mission will be too difficult; therefore, the solution is to just incorporate the MH-60S into the current ASAR mission. While it is obvious that there are significant hurdles to overcome to incorporate a four-helicopter detachment into the ATF, the critical mission support and flexibility that these additional assets will bring to the ATF outweigh the disadvantages. If the Marine Corps is serious about maintaining a viable forcible entry capability and the ability to operate autonomously, the capabilities of the MH-60S must not be ignored.



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